Docket No. 20025-HI

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:)
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N.K. Huppert)
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For: TRUSS ANCHORING ASSEMBLY)
FOR BUILDINGS)

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TRUSS ANCHORING ASSEMBLY FOR BUILDINGS

This application is a continuation in part of parent application Serial No. 09/773,899 filed January 31, 2001 and claims benefit of the filing date of my provisional application, Serial No. 60/247,149 filed November 9, 2000.

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates in general to buildings and more particularly, to a truss anchoring assembly for buildings to anchor the roof assembly against the impact of winds.

Summary of the Prior Art

High winds from hurricanes, tornadoes, and storms can have a severe damaging affect on homes, garages, factories, and other buildings. One common result of the impact of high winds against the sidewalls of a building is the uplifting of the roof frame from the building. The replacement of the entire roof structure requires expensive repair and increases the time of the unavailability of use of the damaged building. In addition, the displacement of the roof structure weakens the rigidity of the sidewalls often causing them to collapse compounding overall damage.

Strong winds from a hurricane and the like normally impact the sidewall of a building at an angle, often parallel to the ground, and are directed upward against the typical overhang of the roof. The upward rising wind pressure creates forces which overcome the integrity of the connection of the roof frame to the lower building framing components because of which the roof

structure breaks away to cause severe damage to the building. Such excess damage results because present roof trusses are only anchored to the upper structure sidewalls and beams through bolts, nails, and the like. Such connecting elements are not anchored to the foundation and are insufficient in securing the roof structure. In many buildings the sills beneath the sidewall are secured to reinforcing rods which are anchored, for example, in a concrete slab. In the past typical reinforcing rods embedded in concrete are only used to anchor the lower building frame. None of the prior art techniques directly connect the roof structure to the building slab independently of the sidewalls or use the slab or other foundation components as a direct anchor for the roof frame. Accordingly, in addition it is desirable to provide a truss securement assembly by which the roof trusses are independently anchored to the building foundation as well as being secured to the building frame as is conventional.

SUMMARY OF THE INVENTION

It is, therefore, an objective of the invention to provide a new technique and assembly to secure roof truss reinforcement assembly for buildings. The invention provides independent anchoring of the roof assembly including trusses and rafters to the foundation, such as a concrete slab, columns, and the like on which houses, garages, factories, warehouses, sheds, and other structures are commonly secured and supported. The truss reinforcement assembly of the invention greatly increases the resistance of the roof structure to the uplifting forces of wind so as to prevent separation of the roof frame and potential collapse of the sidewalls of the building. Although roof plywood components may be displaced under high winds, the invention is effective in insuring that the overall structure remains intact in the presence of much higher wind forces

than possible by prior art techniques of roof securement.

The invention herein employs rod means, which extends from conventional J-bolts rods, such as J-bolts, embedded and anchored to a concrete slab and the like. A unique bracket of the application secures the rod to the structure of roof assembly or upper portion of building, such as to the roof trusses or rafters. The invention provides an inexpensive and easy to install reinforcement of a building against the damaging effects of high winds.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a side elevational view, with parts in section, of truss anchoring assembly for buildings of the invention;

Fig. 2 is an end elevational view of the truss attachment bracket of the truss anchoring assembly of Fig. 1;

Fig. 3 is the opposite end elevational view of the truss attachment bracket of Fig.2; and

Fig. 4 is a top plan view of the truss attachment bracket of Fig. 2.

Fig. 5 is partial side elevational view of a second embodiment of the truss attachment assembly of the invention;

Fig. 6 is an elevational view of the second embodiment of the truss attachment bracket of the invention;

Fig. 7 is the opposite elevational view of the second embodiment of the truss attachment bracket of the invention;

Fig. 8 is a top plan view of the second embodiment of the truss attachment bracket of the invention;

Fig. 9 is a side elevational view of a plurality of truss anchoring assemblies being anchored to roof assembly;

Fig. 10 is a side elevational view of truss anchoring assembly for anchoring a horizontally disposed truss.

Fig. 11 is a side elevational view of a third embodiment of a connecting bracket of the invention;

Fig. 12 is a bottom plan view of the connecting bracket of Fig. 11; and

Fig. 13 is an end elevational view of the connecting bracket of Fig. 11.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. 1, there is illustrated the truss anchoring assembly for forming an anchored vertical extension for buildings of the invention, generally designated by reference numeral 2. Although one truss reinforcement assembly 2 is shown in Fig. 1, it is contemplated that a plurality of truss reinforcement assemblies 2 will be present in a building dependent on desired strength characteristics. The locations of securement of the assembly 2 may be adjacent corners, at each or some sloped or horizontal trusses of a roof frame, and at midpoint locations along the sidewalls and other locations as needed. In Fig. 1, the truss reinforcement assembly 2 is shown being affixed to a conventional rebar rod 4 embedded in a conventional manner in a concrete slab 6 or other concrete structure. The upper end 4' of the rebar rod 4, commonly called a J-bolt, has a threaded portion 4b. The rebar rod 4 normally anchors the lower sill 8 of a building, such as a house, garage, factory, warehouse, shed, barn, and the like. As is known rebar rod 4 may have bulging rings 4a along its length and a threaded upper end 4b.

The truss reinforcement assembly 2 includes an elongated vertical extension rebar rod 10 having a circular cross-sectional configuration and having a construction similar to rebar rod 4. As is typical, rebar rod 10 also includes enlarged rings 10' along its length. Although rod 10 is shown as a rebar rod, it is within the scope of the invention to use threaded rods, smooth rods, or other elongated connecting elements when desired in accordance with invention. The rod 10 includes a lower threaded portion 12 which is attached to the threaded portion 4b of rod 4 by a coupling nut 14 of a conventional design having opposite internal threads at each end. The rod 10 is arranged to extend upward and terminate with a threaded upper attachment end 16 adjacent to roof truss 20 or rafter.

As shown in Figs. 1-4, a securement bracket 22 secures the threaded end 16 of rod 10 to the truss 20. The bracket 22 is formed from a metal or suitable material and has a flat vertical wall 24 in the form of a plate which hangs from truss 20. A flat wall forming securement ledge 26 is welded or otherwise affixed to plate 24. A gusset 28 is secured to plate 24 and to the lower face of ledge 26 for reinforcement (Figs 1-3). The upper edge 30 of plate 24 is bent at a right angle to form a flat wall 32 which is sloped to form a truss contacting surface 32'. If the truss 20 or roof component is horizontally disposed, the upper wall 32 would then be generally parallel to the horizontal plane of the upper surface 26' of ledge 26. A hole 40 is provided through the ledge 26 to receive the upper end of rod 10. The hole 40 is offset from the truss 20 so that the rod does not need to extend through a hole in the truss 40 in the prior art which weakens the strength of the truss itself.

A downwardly bent portion 34 extends generally at a right angle from wall 32 and forms a downwardly disposed flat rear attachment and support wall arranged generally parallel to plate 24.

The front vertical plate 24, top wall 32, and rear wall 34 form a modified U-shape opening 36 to receive the truss 20 so generally corresponding to the cross-sectional shape of the truss 20 confronting the surfaces of that walls 24, 32, and 34 which are generally in contact or near contact with the two side faces and upper edge face of truss 20. As seen in Figs. 2 to 4, bracket 22 is provided with a plurality of holes 38a, 38b, and 38c respectively in plate 24, wall 32, and wall 34. The holes may receive nails or other mechanical fasteners (not shown) for securing the bracket 22 to the respective faces of truss 20.

As shown in Figs. 5-8, there is illustrated a second embodiment of the bracket for securing the truss anchoring assembly, generally designation by reference numeral 22a. The bracket 22a performs in a similar manner to anchor a truss member as shown in Figs. 1-4. The bracket 22a secures the threaded end 16a of rod 10a to the truss 20a. The bracket 22a is formed from a metal or suitable material and has a vertical wall forming a plate 24a which hangs from truss 20a. A securement ledge 26a is welded or otherwise affixed to plate 24a. A pair of spaced triangular gussets 40' are secured to the top of the ledge 26a and to the front face of vertical plate 24a for reinforcement (Figs. 5, 6, and 7). The upper edge 30a of plate 24a is bent along an axis angular disposed with respect to ledge 24a to form a sloped wall 32a disposed at a right angle to plate 24a. If the truss 20 or roof component is horizontally disposed, the upper edge 30 would then be generally parallel to the horizontal plane of the upper surface 26a' of ledge 26 such as shown in Fig. 9.

A downwardly bent rear portion 34a extends from wall 32a at a right angle and forms a downwardly disposed rear attachment wall which is parallel to plate 24a. As seen in Figs. 5-8, bracket 22a is provided with a plurality of bolts receiving holes 42 respectively in ledge 26a and

wall 34a. A plurality of holes 44 for receiving nails and the like are formed in vertical plate 24a.

As seen in Fig. 9, the bracket 22a (as well as previously described bracket 22) can be anchored to each or alternate ones of the plurality of trusses 20a of a typical sloped roof structure 50 on both sides of the house 52 or other building. As similar to in Fig. 1, the bracket 22a being mounted on truss 20a is secured to the threaded upper end 16a of rod 10a. The bottom portion of rod 10a is secured to rod 4a' which may have a J-shaped end (not shown) and other configuration which is embedded in a concrete slab 6a.

The bracket 22a (as well as bracket 22 shown in Figs. 1-4) may be also be attached directly to an upper portion of all or selected trusses 20a at any intermediate position such as near the hip 56 of the roof as shown in Fig. 9. In its intermediate position, it may be desired to extend the rod 10a through an interior wall 58a for practical aesthetic reasons. As further seen in Fig. 9, a modified bracket 22b (to be described) having a horizontal upper edge 30c, may also be affixed to an upper horizontal beam 60 and then a second extension rod 72 having threaded ends 72a and 72b can be connected to the threaded end 16 through a dual nut 74. A second bracket 20a may be similarly attached to the upper threaded end 72 and to the upper portion of the truss 20a through bracket 22a.

Referring to Fig. 10, there is illustrated a modification of the truss anchoring assembly of the invention, generally designated by reference numeral 2b. The truss anchoring assembly 2b is used to anchor a horizontal truss and employs a truss attachment bracket 22b. The bracket 22b is a formed metal member having vertical plate 24b, horizontal ledge 26b, and a pair of triangular gussets 28b (one of which is shown in Fig. 10) which are attached to vertical plate 24b and horizontal ledge 26. An upper wall 32b extends at a generally right angle to vertical wall 22 to

form a truss contacting surface 32b' which is generally parallel to the top surface 26b' of ledge 26 as seen in Fig. 10. A rear wall 34b extends downward from wall 32b in parallel relationship to vertical plate 22b. One or more nails 80 or other mechanical fastener may be driven through holes (not shown) through wall 32b. A bolt assembly 82 having threaded bolt 82a with washer 82b extends through vertical wall 24b and horizontal truss 20b through holes (not shown). An aligned hole (not shown) in rear wall 34b receives the end of threaded bolt 82a. The end of threaded 82a is secured by nut 82c in conjunction with washer 82d and lock washer 82e. The foregoing fastening technique can also be used in connection with bracket 22 and 22a as described with reference to Figs. 1-9. As in the previous embodiments, the threaded end of 16c of rod 10c extends through a hole in ledge 26b and is attached by nut 90 and locker washer 92. The lower end 12b of rod 10b is affixed to embedded rebar 4b through extender coupling nut 14b as in the previous embodiments. It is within the scope of the invention to employ any number of mechanical fasteners through walls 22, 32, and 34 into and/or through a sloped or horizontal truss as is needed

Referring to Figs. 11-13, there is illustrated a third embodiment of the connecting bracket, generally designated by reference numeral 100, for use in truss anchoring assembly of the invention. The connecting bracket 100 is intended to be attached to a truss (not shown) and receive the threaded end of a vertical rod, such as rod 10 as described in connection with the preceding embodiments.

The connecting bracket 100 is a metal U-shaped member that includes a pair of parallel sides 102 and a base 104. The connecting bracket 100 is inverted over the truss so that the base 104 contacts the upper surface of the truss while the two sides 102 contact the opposed side faces

faces of the truss. Plurality of holes 106a,b are provided through side walls 102 to receive mechanical fasteners, such as nails, to secure connecting bracket 100 to the truss. The holes 106a are offset on wall 102 relative to opposed holes 106b side by side and up and down that eight nails placed in the holes will not be in alignment and adequate securement is provided without having to drive the nails completely through the truss to prevent splitting of the truss.

A metal block 110 having six opposed is affixed to one of the sides 102. The block 110 is angularly oriented in accordance with the slope of truss so that the generally vertical securement rod (not shown) can be attached to threaded hole 112 provided through the block 110, which hole 112 is also in generally vertical alignment due to the angular orientation of the block 110 on the sidewall 102.The hole 112 is offset from the truss so that the vertical rod does not need to extend through the truss. The bracket 100 is arranged to support and secure a truss under high wind conditions in a similar manner as described in connection with the foregoing embodiments of Figs. 1-10.